

CLAIMS

1. An information recording medium on which an entire stream including a plurality of portion streams, each of which comprises content information constructing a series of contents, is multiplexed-and-recorded by a unit of packet, which is a physically accessible unit, comprising:

an object data file, which is a logically accessible unit, for storing object data which comprises a plurality of packets, each storing therein a piece of the content information;

a reproduction sequence information file for storing reproduction sequence information which defines a reproduction sequence of the object data stored in said object data file; and

an object information file for storing, as reproduction control information for controlling reproduction of said object data file, related group definition information for defining as a related group a set having a specific relation out of a plurality of content information constructing the plurality of portion streams,

wherein discontinuity information for indicating a discontinuous condition of a serial number of the plurality of packets corresponding to a recording order upon multiplexing-and-recording is given to said related group definition information commonly with respect to a plurality of related groups, the discontinuous condition being generated by a lack of the packet upon editing after the multiplexing-and-recording, with respect to the serial number.

2. The information recording medium according to claim 1, wherein the discontinuity information is unified and written with respect to the plurality of related groups.

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3. The information recording medium according to claim 1, wherein the discontinuity information includes: point information for indicating a point at which the discontinuous condition is generated; and offset information for indicating the number of the
10 packet lacked at the point.

4. The information recording medium according to claim 1, wherein said object information file stores, as another reproduction control information for controlling the reproduction of said object
15 data file, correspondence definition information which defines a correspondence relationship between the plurality of packets which are multiplexed and the plurality of portion streams.

5. The information recording medium according to claim 4,
20 wherein the correspondence definition information has address information, which includes at least one portion of the serial number associated with the packets constructing each portion stream and a display start time point corresponding thereto, for each of the plurality of portion streams.

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6. The information recording medium according to claim 5,

wherein if the content information is video information based on a MPEG 2 (Moving Picture Experts Group phase 2) standard, the address information includes the serial number of the packets associated with an i picture and a display start time point
5 corresponding thereto.

7. The information recording medium according to claim 4, wherein the correspondence definition information further has table information for indicating a packet identification number which is
10 given uniquely between the plurality of packets multiplexed at the same time point, for each of the portion streams.

8. The information recording medium according to claim 1, wherein said object information file further stores, as the
15 reproduction control information, sub group definition information for defining as a sub group a set of a plurality of portion streams which are mutually changeable upon reproducing in the related group.

20 9. The information recording medium according to claim 1, wherein

the entire stream comprises at least one portion of a transport stream of MPEG 2, and

the related group definition information defines as the
25 related group a set having a relationship of multiple broadcast out of the plurality of a series of contents.

10. An information recording apparatus for multiplexing and recording an entire stream including a plurality of portion streams, each of which comprises content information constructing a series of contents, onto an information recording medium by a unit of packet, which is a physically accessible unit,

said information recording apparatus comprising:

a first recording device for recording an object data file, which is a logically accessible unit, for storing object data which comprises a plurality of packets, each storing therein a piece of the content information;

a second recording device for recording a reproduction sequence information file for storing reproduction sequence information which defines a reproduction sequence of the object data stored in said object data file; and

a third recording device for recording an object information file for storing, as reproduction control information for controlling reproduction of said object data file, related group definition information for defining as a related group a set having a specific relation out of a plurality of content information constructing the plurality of portion streams,

wherein discontinuity information for indicating a discontinuous condition of a serial number of the plurality of packets corresponding to a recording order upon multiplexing-and-recording is given to said related group definition information commonly with respect to a plurality of related groups,

the discontinuous condition being generated by a lack of the packet upon editing after the multiplexing-and-recording, with respect to the serial number.

- 5 11. An information recording method of multiplexing and recording an entire stream including a plurality of portion streams, each of which comprises content information constructing a series of contents, onto an information recording medium by a unit of packet, which is a physically accessible unit,
- 10 said information recording method comprising:
- a first recording process of recording an object data file, which is a logically accessible unit, for storing object data which comprises a plurality of packets, each storing therein a piece of the content information;
- 15 a second recording process of recording a reproduction sequence information file for storing reproduction sequence information which defines a reproduction sequence of the object data stored in said object data file; and
- a third recording process of recording an object information
- 20 file for storing, as reproduction control information for controlling reproduction of said object data file, related group definition information for defining as a related group a set having a specific relation out of a plurality of content information constructing the plurality of portion streams,
- 25 wherein discontinuity information for indicating a discontinuous condition of a serial number of the plurality of

packets corresponding to a recording order upon multiplexing-and-recording is given to said related group definition information commonly with respect to a plurality of related groups, the discontinuous condition being generated by a lack of the packet
5 upon editing after the multiplexing-and-recording, with respect to the serial number.

12. An information reproducing apparatus for reproducing the recorded content information from said information recording
10 medium according to claim 1,

said information reproducing apparatus comprising:

a reading device for physically reading information from said information recording medium; and

a reproducing device for reproducing the object data included
15 in the information read by said reading device on the basis of the reproduction control information and the reproduction sequence information included in the information read by said reading device.

13. The information reproducing apparatus according to claim 12,
20 wherein upon accessing arbitrary packet, said reproducing device accesses the arbitrary packet by specifying an address of the arbitrary packet on the basis of the discontinuity information.

14. The information reproducing apparatus according to claim 12,
25 wherein said reproducing device specifies an address of an arbitrary packet on the basis of the discontinuity information and maintains

it in a memory in advance, and accesses the arbitrary packet on the basis of the address maintained in the memory.

15. An information reproducing method of reproducing the
5 recorded content information from said information recording medium according to claim 1,

said information reproducing method comprising:

a reading process of physically reading information from said information recording medium; and

10 a reproducing process of reproducing the object data included in the information read by said reading process on the basis of the reproduction control information and the reproduction sequence information included in the information read by said reading process.

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16. An information recording and reproducing apparatus for recording content information onto said information recording medium according to claim 1 and reproducing the recorded content information,

20 said information recording and reproducing apparatus comprising:

a first recording device for recording the object data file;

a second recording device for recording the reproduction sequence information file;

25 a third recording device for recording the object information file;

a reading device for physically reading information from said information recording medium; and

a reproducing device for reproducing the object data included in the information read by said reading device on the basis of the reproduction control information and the reproduction sequence information included in the information read by said reading device.

17. The information recording and reproducing apparatus according to claim 16, wherein upon accessing arbitrary packet, said reproducing device accesses the arbitrary packet by specifying an address of the arbitrary packet on the basis of the discontinuity information.

18. The information recording and reproducing apparatus according to claim 16, wherein said reproducing device specifies an address of an arbitrary packet on the basis of the discontinuity information and maintains it in a memory in advance, and accesses the arbitrary packet on the basis of the address maintained in the memory.

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19. The information recording and reproducing apparatus according to claim 16, further comprising: an editing device for controlling said third recording device to additionally record the discontinuity information if the lack of the packet is generated upon editing.

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20. An information recording and reproducing method of recording content information onto said information recording medium according to claim 1 and reproducing the recorded content information,

5 said information recording and reproducing method comprising:

 a first recording process of recording the object data file;

 a second recording process of recording the reproduction sequence information file;

10 a third recording process of recording the object information file;

 a reading process of physically reading information from said information recording medium; and

 a reproducing process of reproducing the object data included
15 in the information read by said reading process on the basis of the reproduction control information and the reproduction sequence information included in the information read by said reading process.

20 21. A computer program for controlling record which controls a computer provided in said information recording apparatus according to claim 10 and which causes the computer to function as at least one portion of said first recording device, said second recording device, and said third recording device.

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22. A computer program for controlling reproduction which

controls a computer provided in said information reproducing apparatus according to claim 12 and which causes the computer to function as at least one portion of said reproducing device.

5 23. A computer program for controlling record and reproduction which controls a computer provided in said information recording and reproducing apparatus according to claim 16 and which causes the computer to function as at least one portion of said first recording device, said second recording device, said third recording
10 device, and said reproducing device.

24. A data structure including a control signal, in which an entire stream including a plurality of portion streams, each of which comprises content information constructing a series of contents, is
15 multiplexed-and-recorded by a unit of packet, which is a physically accessible unit, having:

an object data file, which is a logically accessible unit, for storing object data which comprises a plurality of packets, each storing therein a piece of the content information;

20 a reproduction sequence information file for storing reproduction sequence information which defines a reproduction sequence of the object data stored in said object data file; and

an object information file for storing, as reproduction control information for controlling reproduction of said object data file,
25 related group definition information for defining as a related group a set having a specific relation out of a plurality of content

information constructing the plurality of portion streams,

wherein discontinuity information for indicating a discontinuous condition of a serial number of the plurality of packets corresponding to a recording order upon multiplexing-and-recording is given to said related group definition information commonly with respect to a plurality of related groups, the discontinuous condition being generated by a lack of the packet upon editing after the multiplexing-and-recording, with respect to the serial number.